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THE GRAIN QUALITY INDICATORS OF BUCKWHEAT

Isroilov Bakhtiyor
PhD student of The Department of Plant Science
Toshkent State Agrarian University

Abstract. This study evaluated the effect of sowing date and planting method on buckwheat grain quality when cultivated as a second crop. Results showed that delayed sowing reduced grain uniformity by 1-4%. Optimal uniformity (84%) was achieved with early sowing (June 20) using a single-row method at 1 million seeds/ha, whereas the lowest (80%) resulted from late sowing (July 10) with a triple-row method at 3 million seeds/ha. Similarly, grain test weight was highest (472 g/l) under early sowing with single-row planting and lowest (465 g/l) under late sowing with high-density triple-row planting. The findings demonstrate that early sowing with moderate plant density is crucial for maximizing both grain uniformity and test weight in second-crop buckwheat.

Keywords: buckwheat, second crop, sowing date, seeding rate, planting method, grain quality, grain test weight (hectoliter weight), grain uniformity.

INRODUCTION

One of the most important requirements in buckwheat production is the improvement of product quality. The grain quality indicators of buckwheat are divided into two categories:

1. Agronomic quality indicators, which include: grain plumpness, 1000-grain weight, grain test weight (hectoliter weight), groat yield, and others.

2. Technological quality indicators, which include: grain translucency (glossiness), protein content in the grain, lysine content in the grain, vitamins, and minerals [1].

In buckwheat production, enhancing the agronomic quality indicators of the product is of particular importance. Grain plumpness and grain test weight are considered agronomic quality indicators. Large grain size, favorable standard dimensions, and higher volumetric weight facilitate the process of producing groats and ensure higher product quality.

A distinctive characteristic of buckwheat is the presence of rutin. The content of rutin in the grain has been studied in numerous scientific works. According to experimental data, significant differences in rutin content among different species have been established.

Based on data provided by V.M. Vazhov [3], buckwheat grain contains valuable amino acids: lysine content is 7.9 %, and arginine content is 12.7 %. Furthermore, the groat contains significant amounts of valuable ash elements such as potassium, calcium, iodine, and boron.

In her scientific research, O.S. Mishina [4] studied the importance of biologically active substances in the growth and development of different buckwheat varieties and in activating important physiological processes within the plant.

MATERALS AND METHODS

The experiment was conducted in 2015-2017 in the field of experimental plot of the Tashkent State Agrarian University. The soil of the experimental field is a typical sierozem, which has been irrigated for a long time, the mechanical composition is sandy, the groundwater is located at a depth of 15-18 meters.

The experiment studied the influence of different sowing dates, seeding rates, and planting methods on the growth, development, and yield of the buckwheat variety “Илишевская” cultivated as a second crop. Buckwheat seeds were sown at three dates (early -June 20, medium- July 1, late - July 10), using three seeding rates (1 million seeds/ha, 2 million seeds/ha, and 3 million seeds/ha), and three planting methods (single-row, double-row, and triple-row).

The research was conducted in the field and in the laboratory, including the placement of field experiments, calculations and observations “Methods of Conducting Field Experiments”, “Scientific Research Work in Plant Growing”, and “Методика полевого опыта” (B.Dospekhov, 1985) based on methodological guidelines [2; 5; 6; 7].

RESULTS

Grain uniformity is considered one of the important quality indicators in buckwheat plants. When buckwheat grains are uniform, their initial processing and the extraction of groats become easier, significantly improving groat quality. It has been noted that grain uniformity depends on varietal characteristics, soil and climatic conditions, and to a certain extent on agrotechnical practices, including sowing date, seeding rate, and planting methods.

In the conducted experiment, it was observed that the uniformity of buckwheat grain primarily depends on the sowing date, seeding rate, and planting method. Specifically, in the experiment, grain uniformity in the treatment sown early on June 20 with the single-row method at 1 million seeds/ha was 84 %; in the treatment with the double-row method at 2 million seeds/ha, it was 83 %; and in the treatment with the triple-row method at 3 million seeds/ha, it was 82 %. It was observed that as seeding rates increased, grain uniformity changed by 1-2 % (Table 1).

Table 1

The Effect of Sowing Date, Seeding Rate, and Planting Method on Agronomic Quality Indicators of Buckwheat (Average 2015-2017)

№	Sowing date	Seeding rate, million pieces/ha	Planting method	Uniformity, %	Grain Test Weight (Hectoliter Weight), g/l
1	June 20	1	the single-row	84	472
2		2	the double-row	83	471
3		3	the triple-row	82	471
4	July 1	1	the single-row	82	470
5		2	the double-row	81	469
6		3	the triple-row	81	467
7	July 10	1	the single-row	81	468
8		2	the double-row	80	466
9		3	the triple-row	80	465

In treatments sown on July 1 and July 10 with the single-row method at 1 million seeds/ha, uniformity was 82-81%; with the double-row method at 2 million seeds/ha, it was 81-80%; and with the triple-row method at 3 million seeds/ha, it was 81-80%. Consequently, compared to the treatments sown on June 20, a change of 2-3% was observed in the treatment with the single-row method at 1 million seeds/ha, 2-3% in the treatment with the double-row method at 2 million seeds/ha, and 1-2% in the treatment with the triple-row method at 3 million seeds/ha.

Another major agronomic quality indicator of buckwheat grain is the grain test weight (hectoliter weight). Grain test weight refers to the volumetric weight of the grain. It has been established that the volumetric weight of grain, i.e., its test weight,

depends on grain density and the degree to which it is sufficiently supplied with mineral nutrients.

In the experiment, relatively high buckwheat grain test weight values across variants were recorded. When buckwheat seeds were sown on June 20, the test weight was 472 g/l with the single-row method at 1 million seeds/ha, and an identical 471 g/l with both the double-row method at 2 million seeds/ha and the triple-row method at 3 million seeds/ha. In the conducted experiment, the results showed that grain test weight had a direct positive correlation with grain uniformity indicators.

CONCLUTION. The experiment revealed that delaying the sowing date caused a decrease in buckwheat grain uniformity of 1-4%. The highest grain uniformity indicator (84%) was observed in the treatment where buckwheat was sown on June 20 using the single-row method at 1 million seeds/ha, while the lowest (80%) was observed in the treatment sown on July 10 using the triple-row method at 3 million seeds/ha. Regarding grain test weight in buckwheat grown as a second crop, the highest value (472 g/l) was recorded in the treatment sown on June 20 with the single-row method at 1 million seeds/ha. The lowest value (465 g/l) was observed in the relatively late-sown treatment on July 10 using the triple-row method at 3 million seeds/ha.

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